



NRC NEWS

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“Perspectives Upon Joining the Nuclear Regulatory Commission”

The Honorable Peter B. Lyons

Commissioner

U.S. Nuclear Regulatory Commission

at the

Regulatory Information Conference

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With a grand total of six weeks of service as a Commissioner, I hope you can appreciate that I am still very much in a learning mode. I’ve been helped in this process by my fellow Commissioners and many staff members of the Commission. In the process, I’ve been most impressed with the caliber of personnel within the Commission and the depth of their commitment to the successful realization of our mission. But while I know a lot more about the Commission’s procedures and challenges than I did six weeks ago, I don’t feel ready to provide a detailed discussion to this very knowledgeable group on issues facing us.

Instead, I’d like to use my first opportunity to address the Regulatory Information Conference to provide a sketch of the background that I bring to this assignment, discuss why I eagerly accepted the President’s appointment to serve on the Commission, and list some of the challenges that I foresee for the Commission.

My graduate training at California Institute of Technology focused on nuclear physics and its applications to astrophysics. My advisers, Nobel Laureate Professor Willy Fowler and Professor Charles Barnes, were superb role models and friends that helped me throughout my time at Cal Tech.

From Cal Tech, I went to the Los Alamos National Laboratory, although back in 1969 when I arrived it was still known as Los Alamos Scientific Laboratory – a distinction that some of us old-timers fondly remember. That began my career in national security, which I define to encompass military, economic, environmental, and energy security – a calling that I have followed ever since.

At Los Alamos, I spent my first 15 years supporting our nation’s nuclear weapons test programs, with extensive work at the Nevada Test Site supporting many tests, plus participation in many Laboratory-based plasma physics experiments. Later, as I advanced in management, I led or

shared leadership in the Laboratory's contributions to weapons design, weapons engineering, strategic defense, the intelligence community, energy and environmental programs, and industrial interactions.

After almost 30 years in Los Alamos, I moved to Washington to serve first as science advisor to Senator Pete Domenici and later on the staff of the Senate Energy and Natural Resources Committee, chaired by Senator Domenici. During my eight years with the Senator, I became very familiar with issues involving nuclear energy and nuclear nonproliferation. I was sworn in as a Commissioner on January 25 following a recess appointment by the President. On February 14, I was nominated by the President for confirmation.

From Cal Tech, Los Alamos, and the U.S. Senate, I've acquired a good understanding of the policy debates, theory, and basic technologies underlying the areas subject to Commission regulation. But I appreciate that I have a big challenge to understand how our regulatory framework oversees safe, practical applications of these technologies and to understand the engineering that translates the basics of nuclear physics into the wide range of nuclear technology systems that can, when properly applied, be of immense benefit to mankind.

I hope that my experiences in experimental science at Cal Tech and Los Alamos will bring an important point of view to the Commission. Those experiences lead me to have a healthy respect for the limitations of even the very best calculations. All too often I witnessed results of a test that differed enough from expectations to provide new insights into the physics and engineering that was missing from our models.

As one example, I participated in many of the early laser fusion experiments. There was immense optimism then, based on the best calculations available at the time, that modestly sized, fairly inexpensive, lasers would provide enough energy to ignite fuel and enable efficient production of fusion energy. The earliest calculations suggested successful power generation using fairly low-power lasers. Some assumed that successful laser fusion was just around the corner and would soon be producing power for the grid.

Thirty years and many corners later, you don't hear much today about laser fusion supplying grid power in the near future. The early predictions for success with small lasers are now replaced by the nation's construction of the multi-billion dollar National Ignition Facility at the Lawrence Livermore National Laboratory, where ignition and energy gain might be demonstrated, with attempts starting around 2010. That laser, sized at two million joules, is a far cry from the early predictions.

It seems that careful experiments, some done by my group at Los Alamos, simply did not support the optimism of the early calculations, which were sadly lacking in accurate descriptions of many aspects of the underlying physics. Whenever the National Ignition Facility begins operation, we'll see if Mother Nature has more new physics surprises up her sleeve!

Calculations and modeling have a critical role in any technically complex endeavor, certainly including the work of the Commission. But I've learned that computational models are as good, or as bad, as the depth of the physics and engineering underpinning them. Models require careful validation. I hope this questioning approach to issues will be useful in my new role.

I'd like to turn to my second topic – that is why I was eager to accept the role of a Commissioner. To address that point, I'd like to describe a 2004 Senate hearing, chaired by Senator Domenici, that addressed sustainable approaches to electricity generation. The first witness was Nobel Laureate Professor Richard Smalley. He painted a compelling vision of the serious energy shortage that the world is facing and how that crisis will sharply intensify in years to come. He and the other witnesses outlined the only three expandable energy sources on the shelf now that will be available in the foreseeable future to support our energy needs for at least the next century or more.

Oil and gas resources were not a part of this hearing. They simply are not sustainable on this time scale. While experts debate the longevity of these options, there is no debate that each is finite. Some suggest that the world may be at or near its peak oil production, even while we witness new oil demands from developing nations to add to the thirst in developed nations. And while natural gas is more abundant and its utility will extend further into the future, prices are likely to further escalate making it harder to justify use of that resource for electricity production.

The only three suitable energy resources identified in that Hearing were renewables, coal, and nuclear energy. For each source, there are major uncertainties, risks, and benefits in its future utilization, and these issues were discussed at the Hearing. Implicit in the Hearing was the view that the world is going to be so starved for energy that rejection of any one of these sources would seriously intensify the challenge of using only the remaining ones to sustain our economic health.

So will nuclear energy contribute to these future needs? The Administration and many leaders in Congress believe so. The President emphasized support for nuclear energy in his State of the Union address and his FY2006 budget proposal; and Congress has consistently provided strong funding in the last few years.

In the President's budget, even in an austere budget year when the budget of the Department of Energy is proposed to decrease by almost three percent, nuclear energy research and development received a twelve percent increase. The NP2010 program was proposed at \$56 million with the Generation IV reactor program at \$45 million, both up about thirteen percent from this year. Nuclear production of hydrogen was proposed at \$20 million, more than double this year's funding, and the Advanced Fuel Cycle Initiative was listed for \$70 million, also increased from this current year. Yucca Mountain funding was proposed at \$651 million, up from \$577 million in the current year.

Industry is showing strong interest in a rebirth of nuclear power. They are responding to the Early Site Permit and Combined Operating License programs. Many license renewal applications have been filed for 20 year operating extensions, and the Commission has approved 30 renewals to date. Over 100 power uprates have also been approved. Conferences of industry leaders now routinely express optimism for construction of new plants.

In the last year, several environmental leaders have recognized the role that nuclear energy could play in meeting future energy challenges and in addressing their concerns on the impacts of greenhouse gas emissions. Some of these leaders have made statements supportive of nuclear energy,

in sharp contrast to the distaste for nuclear energy expressed by this movement in the past. In recent months, James Lovelock, a leading environmentalist and creator of the Gaia theory; Hugh Montefiore, the former Bishop of Birmingham and former chairman of Friends of the Earth; and Patrick Moore, one of the founders of Greenpeace, have all spoken out on this issue. As just one example, Moore stated that “Nuclear energy is the only non-greenhouse gas-emitting power source that can effectively replace fossil fuels and satisfy global demand.”

But can nuclear power really contribute to our future energy needs? Certainly there will be many contributors to answering this question. Before the answer can be “Yes,” the Department of Energy must demonstrate continued strong support for nuclear energy. This must include funding to assist in certification of new designs and workforce training within our universities. Federal or state policies that limit carbon emissions may provide further impetus. Companies offering advanced reactor designs must provide high confidence that reactor construction costs are accurately known and competitive with other energy sources. Utilities must make concrete proposals for new construction. The financial community must weigh whether their own risks have been sufficiently well managed to provide capital. And, in my view, the public probably will also demand better solutions to proliferation issues associated with nuclear power and further progress on nuclear waste before new construction orders will be placed.

But even those events won’t bring about new construction unless the public has confidence in the strong regulatory oversight of safety provided by the Commission. That oversight must be translated into continued safe operations by the nuclear utilities and continued safe uses of radioactive sources. Equally important, the public must be assured that the Commission has taken appropriate actions to address increased concerns about the security of nuclear power plants and sources in a post 9/11 world. Rule-making activities of the Commission in this area will be important in establishing clear requirements.

The public is not the only stakeholder group watching the Commission and weighing our actions. Industry will also be watching for assurances that the Commission’s licensing actions are impartial, fair, based on sound engineering and scientific judgments, and completed in predictable time frames. Without evidence of these conditions, I doubt that any company will consider construction of a new nuclear power plant.

Thus, in my view, the Commission’s oversight responsibilities and actions are critical to considerations of any future role for nuclear energy. My recess appointment provides an opportunity for me to make a positive contribution to the challenges facing the Commission. I believe that the Commission is on track to meet these challenges and I look forward to working, together with my fellow Commissioners, to continue to meet them.

Finally, I want to turn to the issues that I will emphasize as I begin my work on the Commission. I’m sure that this list will grow as I learn more of the challenges facing us, but perhaps it will be useful for you to understand some of my initial thoughts.

Highest on my issues is **safety** – ensuring protection of the public health and safety and the environment. The challenges from Davis-Besse best describe my intended focus. By this, I don’t mean the precise problem or the corrective actions taken at that plant; instead I refer to the broad issue

that the degraded conditions at Davis-Besse could and should have been detected sooner.

The Reactor Oversight Process has been modified since the Davis-Besse problems and multiple studies have explored the root causes of that situation. Many corrective actions have been taken as a result. In months to come, I want to study this issue and the responses from the Commission to be able to add my assurance to the American public that there will not be another “Davis-Besse” situation.

Integrated with safety is the broad subject of security. Since 9/11, our nation has faced a new security threat, one that presents an immense challenge to our way of life. Information flow throughout our country has been modified, and this has led to concerns about erosion of the open society that we’ve known for the first two centuries of our existence as a nation. The nuclear industry has been affected by this change.

I have no doubt that the nuclear industry must respond to these changes. Less information about some aspects of our work will, of necessity, be available to the public. That is regrettable because well-informed citizens are essential in better understanding operations, risks, and benefits involving nuclear technologies, and in providing appropriate challenges to ways in which we’re doing business. But, in the post 9/11 world, I see no alternative but to carefully evaluate the information that we release from the perspective of its possible utility to terrorists. There will be less information released with this change, but that doesn’t stop our responsibility to communicate effectively with the public on all areas open for discussion.

Before starting work here, I was well aware of many of the changes made at each nuclear plant to enhance security. I’ve learned of still more improvements since my arrival. The leadership of the three senior members of the Commission has been impressive. Also, industry has made admirable progress.

I have heard the plea from industry for a stable security environment, one in which they can plan with confidence to meet specific security challenges and be assured that the ground rules won’t change again. I agree that stability in the security programs is highly desirable. But I also realize that we cannot assure that the perceived threat will be similarly constant. Thus, while I hope we can achieve stability, I feel that it must be conditioned on the best intelligence information we obtain. And if the threat changes enough to demand further security changes, we must respond.

After 9/11, the Commission issued orders enhancing the Design Basis Threat. Industry has responded with major improvements including large investments in security personnel and equipment. I’ll bring at least four perspectives to calls for further enhancements in this area:

- first, as I previously indicated, we can't assure that the threat will not change in some substantial way,
- second, we must strike a very careful balance between further strengthening private security forces at each plant and increased planning to bring local, state, and national law enforcement and military resources to bear on the threat. As a nation, we should discuss just how far we

wish to proceed with creation of still stronger private security forces at each plant versus better use of other resources,

- third, the roles of personnel and technology must be carefully balanced in addressing security issues. Industry's response has included both aspects, and I hope the right balance is being obtained. As new plants are designed, it seems logical to me that companies will demand careful attention to design options that optimize plant security,
- and fourth, we need to view the security of nuclear plants relative to the hardness of other critical elements of our nation's infrastructure. Other elements of that infrastructure are far below our nuclear plants in security preparedness. Just as the security of nuclear power plants has been enhanced, as a nation we need significant hardening of other critical elements of our infrastructure.

Another area of concern involves **human capital** issues. These issues extend far beyond the Commission and include all agencies and industries dependent on utilization and understanding of nuclear technologies. Therefore, I include the nuclear power industry, the national laboratories, our nuclear navy, nuclear engineering and health physics departments in our universities, parts of the Department of Energy and the Environmental Protection Agency, medical diagnostic and therapeutic providers, and all other entities depending on nuclear technologies. In all these places, too many staff are nearing retirement and we simply are not training enough replacements.

I've learned about efforts at the Commission to support student programs and encourage students to pursue careers involving nuclear technologies. I hope that every company and agency represented here today has similar programs, and is strongly supporting and encouraging workforce training at every opportunity. This problem requires efforts from all of us to help develop and sustain a highly skilled and effective technical workforce.

In closing, I look forward to my service on the Commission. I will be fair and impartial in all decisions in which I will participate. Each issue will have multiple dimensions, and I will carefully evaluate all information on each issue provided to the Commission.

I noted early in these remarks that my entire career, since my 1969 arrival at Los Alamos, has been devoted to our national security. That is how I view my service with the Commission. There can be no doubt that the Commission makes a critical contribution to national security. Safe, secure operations of our nuclear plants, along with safe, secure control of medical and industrial applications of nuclear technologies are a direct contribution to the security of our nation.